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# SPACECRAFT OPERATIONS MANUAL FOR EPE-D LAUNCH

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**GODDARD SPACE FLIGHT CENTER**  
**GREENBELT, MARYLAND**

SPACECRAFT OPERATIONS MANUAL  
FOR EPE-D LAUNCH

EASTERN TEST RANGE  
CAPE KENNEDY, FLORIDA

7 October 1964

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## INTRODUCTION

It is the basic intent of this manual to serve as an overall informational guide to all personnel engaged in the launch operations of the EPE-D spacecraft. The primary objectives of the information contained within are as follows:

- a. To indicate a schedule of events and integration personnel assignments which will provide for the most effective use of all personnel and material throughout the launch operation;
- b. To provide the GSFC Field Projects Branch, ETR with the information necessary to insure that the launch activities of all integration personnel are fully compatible with the launch activities of the ETR personnel;
- c. To provide a step-by-step countdown procedure for integration personnel which will provide the Mission Director with a maximum level of confidence in the operational capabilities of the spacecraft when launched.

A schedule of events for the EPE-D Spacecraft is illustrated, beginning on page 3 of this manual. The schedule is illustrated in calendar form on page 6. Prior to F-11, all spacecraft operational checkouts will be performed in accordance with the EPE-D Integration Procedure Manual. Prior to an operational checkout on the vehicle, the Flight, or ETU Spacecraft must be sent to the ETR Spin Facility for mounting to the 3rd stage. While at the Spin Facility, all operations are under the direction of ETR personnel. Once the spacecraft has been mounted on the Delta Vehicle, all operational checkouts will be performed as outlined in the F-1 or F-0 countdown procedure which is also a part of this manual.

A block diagram indicating the communications network which will be used in all spacecraft operational checkouts using the F-1 or F-0 countdown procedure is illustrated on page 8. Personnel assignments to the stations indicated on the communications diagram are found on page 28. Beginning on page 10, a step-by-step procedure to be used during the F-1 and F-0 countdown is illustrated. A sequence of events for F-1 and F-0 is illustrated on pages 26 and 26A. A map of the ETR Facility at Cape Kennedy, Florida is included on page 29.

EPE-D ETR  
SCHEDULE OF EVENTS  
FROM  
F -13 THROUGH F +1

F-13      INTEGRATION PERSONNEL ARRIVE  
GSE SETUP AND CHECKOUT IN AE HANGAR

F-12      FLIGHT UNIT ETU AND SOURCES DELIVERED TO AE  
HANGAR  
FLIGHT SPACECRAFT CHECKOUT  
ETU CHECKOUT

F-11      FLIGHT UNIT ANTENNA RANGE TEST  
DESPIN TIMER TEST - SQUIBS FIRED  
FLIGHT UNIT PHOTOGRAPHS

F-10      FLIGHT UNIT CHECKOUT & EXPERIMENT CALIBRATION  
IN AE HANGAR

F-9      FLIGHT UNIT CHECKOUT & EXPERIMENT CALIBRATION  
IN AE HANGAR

F-8      FLIGHT UNIT CHECKOUT AND EXPERIMENT CALI-  
BRATION IN AE HANGAR  
CHECKOUT BLOCKHOUSE CONTROL EQUIPMENT  
(See Page 7 )

F-7            FINAL FLIGHT UNIT CHECKOUT BEFORE MOUNTING  
                 TO LIVE THIRD STAGE

                 DESPIN TEST -SQUIBS FIRED

                 ETU TO SPIN FACILITY FOR MOUNTING TO DUMMY  
                 THIRD STAGE.

F-6            RFI TEST WITH ETU ON VEHICLE

                 0800 - 1030    BLOCKHOUSE CONTROL EQUIPMENT  
                                    CHECK & SPACECRAFT CHECKOUT

                 1030 - 1230    FAIRING INSTALLATION

                 1230 - 1400    RFI TEST-SPACECRAFT SIGNAL MEASURED  
                                    AT SATELLITE TRACKING STATION AND  
                                    I & E HANGAR.

                 1400 - 1430    TOWER REMOVAL

                 1430 - 1630    RFI TEST REPEATED

                 FLIGHT UNIT BALANCE AND ALIGNMENT AT SPIN FACILITY

F-5            FLIGHT UNIT BALANCE AND ALIGNMENT

                 ETU CHECKOUT AT AE HANGAR

F-4            FLIGHT UNIT BALANCE AND ALIGNMENT

                 ETU CHECKOUT AT AE HANGAR

F-3            FLIGHT UNIT CHECKOUT ON VEHICLE

                 RESET TWO YEAR TIMER

F-2           ORDNANCE INSTALLATION ON VEHICLE (DAC)  
  
PRACTICE F-1 CHECKOUT PROCEDURE WITH ETU  
  
IN AE HANGAR

F-1           FLIGHT UNIT CHECKOUT AS PER F-1 COUNTDOWN  
PROCEDURE IN EPE-D SPACECRAFT LAUNCH  
OPERATIONS MANUAL.

REMOVE STRIP COATING AT NIGHT

F-0           FLIGHT UNIT CHECKOUT AS PER F-0 COUNTDOWN  
PROCEDURE IN EPE-D SPACECRAFT LAUNCH  
OPERATIONS MANUAL

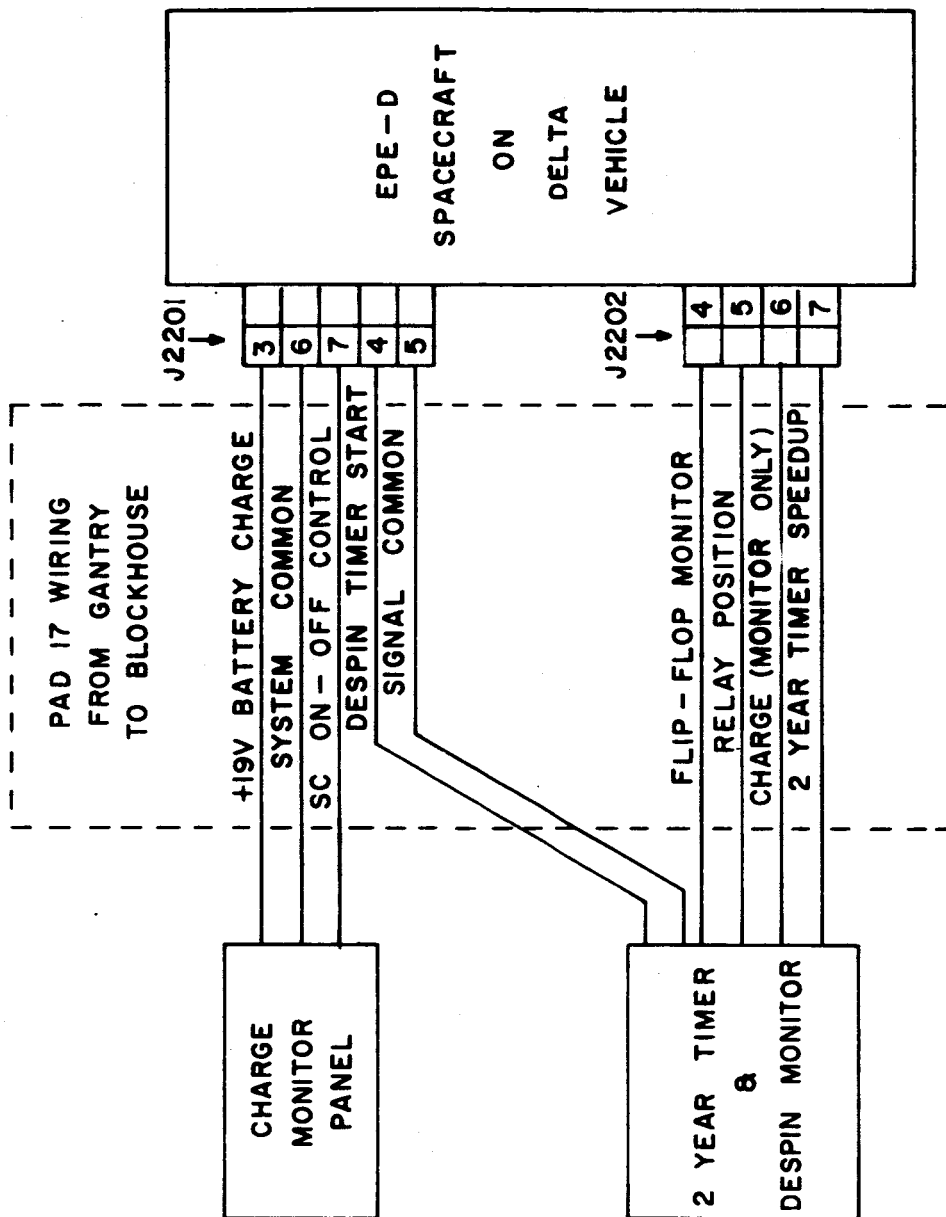
EPE-D LAUNCH

F+1           PACK ALL EQUIPMENT AND ETU FOR RETURN TO GSFC

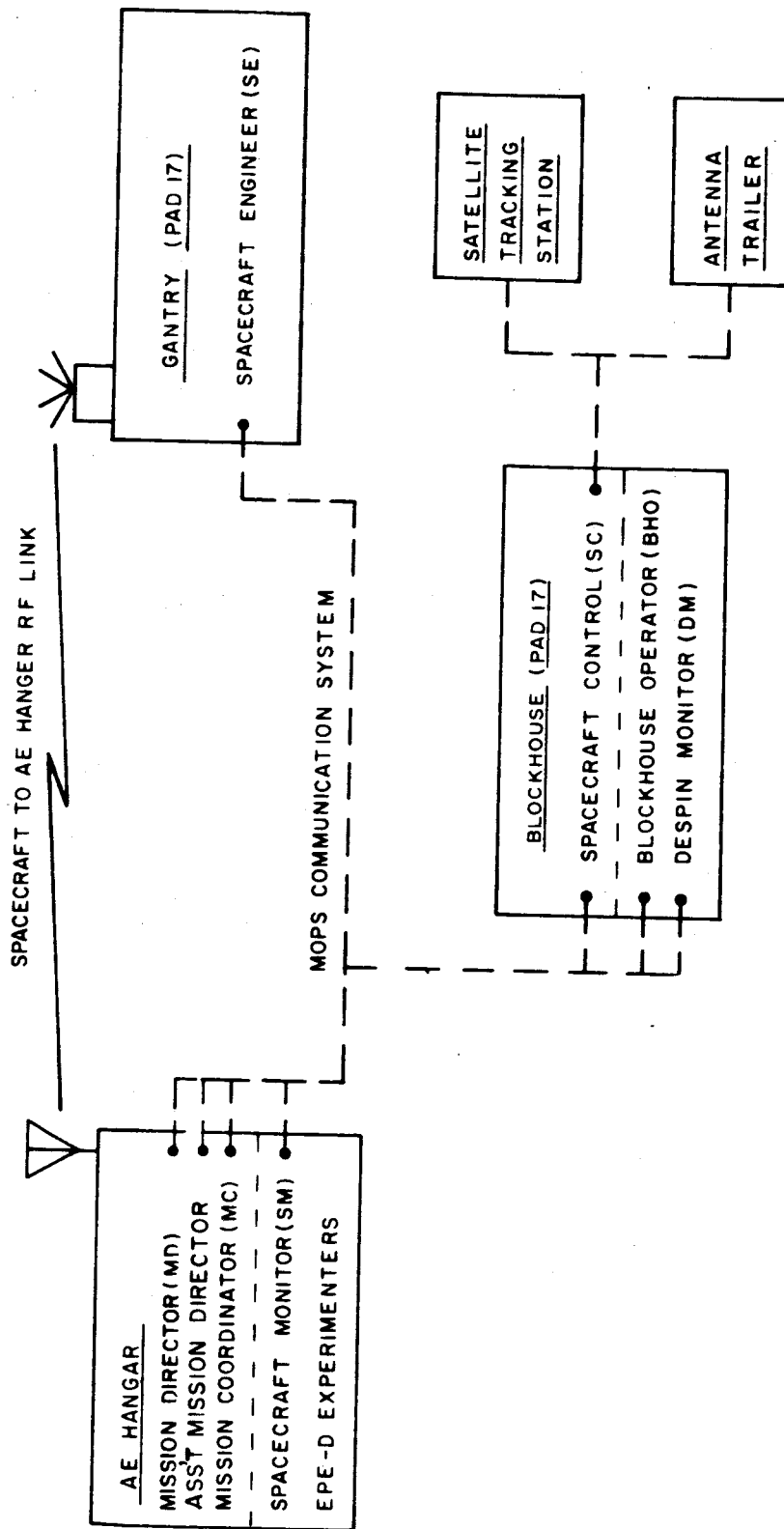
EPE-D SPACECRAFT LAUNCH OPERATIONS CALENDAR OF EVENTS

				<u>F-13</u> Integration Personnel Arrive GSE Setup and Checkout in AE Hangar	<u>F-12</u> Flight Unit, ETU and Sources Delivered to AE Hangar Flight Unit Checkout ETU Checkout
				<u>F-8</u> Flight Unit Checkout and Experiment Calibration in AE Hangar Checkout Blockhouse Control Equipment	<u>F-7</u> Final Flight Unit Checkout Before Mounting to Third Stage Despin Test-Squibs Fired ETU to Spin Facility For Mounting to Dummy Third Stage
				<u>F-3</u> Flight Unit Checkout On Vehicle Reset Two Year Timer	<u>F-2</u> Ordnance Installation on Delta Vehicle (DAC) Practice F-1 Checkout Procedure With ETU in AE Hangar
				<u>F-1</u> Flight Unit Checkout as Per F-1 Countdown Procedure Remove Strip Coating at Night	
				<u>F-0</u> Flight Unit Checkout as Per F-0 Countdown Procedure Launch	
				<u>F-4</u> Flight Unit Balance & Alignment ETU Checkout in AE Hangar	
				<u>F-9</u> Flight Unit Checkout and Experiment Calibration in AE Hangar	
				<u>F-5</u> Flight Unit Balance and Alignment ETU Checkout in AE Hangar	
				<u>F-10</u> Flight Unit Checkout and Experiment Calibration In AE Hangar	
				<u>F-11</u> Flight Unit & ETU Antenna Range Test Paddle System Check Despin Test - Squibs Fired Flight Unit Photographed	
				<u>F-6</u> RFI Test with ETU on Vehicle Flight Unit to Spin Facility for Balance and Alignment	
				<u>F-1</u> Flight Unit Checkout as Per F-1 Countdown Procedure	
				<u>F+1</u> Pack all GSE, Test Equipment and ETU for Return to GSFC	





BLOCK DIAGRAM, BLOCKHOUSE SPACECRAFT CONNECTIONS



BLOCK DIAGRAM, ETR COMMUNICATIONS NETWORK  
FOR EPE-D SPACECRAFT LAUNCH OPERATIONS

## EPE-D SPACECRAFT LAUNCH OPERATIONS REQUIREMENTS

The following list indicates the items that are required from the ETR facility for the launch operations of the EPE-D Spacecraft:

1. Office space in the AE Hangar suitable for the Project Office Staff consisting of the Mission Director, Mission Monitor, Mission Coordinator and secretary;
2. Laboratory space, power and desk availability in the AE Hangar suitable for electronic and mechanical integration operations;
3. Space and power at the antenna range suitable for the GSFC antenna test trailer;
4. Availability of the facilities of the ETR Satellite Tracking Station during spacecraft checkouts on the vehicle to provide signal strength and frequency information;
5. Space and power in the area 17 Blockhouse suitable for operation of the blockhouse control equipment;
6. Laboratory space and four desks for approximately 10 persons associated with the spacecraft instruments and experiments;
7. MOPS communications channels necessary for the spacecraft operational countdown tests.

# F-1 COUNTDOWN EPE-D

<u>TIME (MIN)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
T-490	BEGIN SPACECRAFT CHECKS	SM	SE
1.	VISUALLY INSPECT SPACECRAFT AS PER CHECKLIST. CONNECT UMBILICALS	-	SE
2.	CONNECT METER PANEL TO SPACE- CRAFT	-	SE
3.	RELEASE ANTENNAS	-	SE
4.	REPORT BATTERY VOLTAGE	SE	BHO
5.	REQUEST PERMISSION FROM SC TO TURN ON SPACECRAFT RF	SE	SC
6.	TURN SPACECRAFT ON	SE	BHO
7.	CONFIRM SPACECRAFT IS ON	-	SE/SM
8.	REPORT BATTERY VOLTAGE	SM	BHO
9.	RECORD VOLTAGES AND CURRENTS FROM METER PANEL. VERIFY READINGS ARE SATISFACTORY	SM	SE
10.	VERIFY PP READINGS ARE CORRECT	SM	SE
11.	INFORM SC THAT SPACECRAFT RF WILL BE TURNED OFF	SE	SC
12.	TURN SPACECRAFT OFF	SE	BHO
13.	CONFIRM SPACECRAFT IS OFF	-	SE/SM
14.	REPORT BATTERY VOLTAGE	SM	BHO
15.	DISCONNECT METER PANEL FROM SPACECRAFT AND INSERT LIVE TURN ON PLUG	SM	SE

# F-1 COUNTDOWN EPE-D (continued)

<u>TIME (MIN)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
16.	REPORT BATTERY VOLTAGE	SM	BHO
17.	REQUEST PERMISSION TO TURN ON SPACECRAFT RF	SM	SC
18.	TURN SPACECRAFT ON	SM	BHO
19.	CONFIRM SPACECRAFT IS ON	-	SM
20.	REPORT BATTERY VOLTAGE	SM	BHO
21.	TURN ON CHARGE MONITOR PANEL AND ADJUST CHARGE CURRENT TO 1.5 AMPERES AND CURRENT LIMIT AT 1.5 AMPERES	SM	BHO
22.	PLACE SOURCES ON UCSD AND BTL EXPERIMENTS AND DISPLAY RADIO- ACTIVE WARNING SIGN	SM	SE
23.	REMOVE TAPE FROM I&E APERTURES AND CONNECT I & E CONTROL CLIPLEAD TO ACTIVATE I & E WHEEL	SM	SE
24.	REQUEST FREQUENCY AND SIGNAL STRENGTH FROM SC	SM	SC
25.	RECORD DIGITAL AND ANALOG DATA FOR UCSD AND BTL EXPERIMENTS	SM	-
26.	RECORD TELEMETRY ENCODER INFORMATION	SM	-
27.	RECORD CHANNEL 9 and PP7 FOR ONE REVOLUTION OF I&E WHEEL	SM	-
28.	REMOVE SOURCES AND WARNING SIGNS	SM	SE

# F-1 COUNTDOWN EPE-D (continued)

<u>TIME (MIN)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
29.	APPLY FLASHLIGHT BEAM TO LEFT APERTURE OF I&E SENSOR AND MONITOR CHANNEL ( AND PP7 FOR ONE REVOLUTION OF I&E WHEEL	SM	SE
30.	REPEAT STEP NO. 29 FOR RIGHT APERTURE	SM	SE
31.	INFORM SE OF TIME TO REMOVE I & E CONTROL TO STOP I & E WHEEL IN POSITION NO. 1	SM	SE
32.	CONFIRM I&E WHEEL STOPPED IN POSITION NO. 1	-	SM
33.	REPLACE TAPE ON I&E APERTURES	SM	SE
34.	REMOVE OA SENSOR TOP AND BOTTOM COVERS AND INSPECT PRISM FACES	SM	SE
35.	REPLACE TOP AND BOTTOM COVERS AND REMOVE CENTER COVER	SM	SE
36.	APPLY <u>SUN GUN</u> BEAM AT RANDOM TO OA SENSOR	SM	SE
37.	CONFIRM ALL OCTAL NOS. OBTAINED ON CHANNEL ZERO	-	SM
38.	APPLY STEADY SUN GUN BEAM TO OA SENSOR	SM	SE
39.	CONFIRM ALTERNATING 7 AND 1 ON CHANNEL ZERO AND 7 AND ZERO ON CHANNEL ONE	-	SM
40.	REPLACE OA SENSOR CENTER COVER	SM	SE

# F-1 COUNTDOWN EPE-D (continued)

<u>TIME (MIN)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
	41. APPLY <u>SUN GUN</u> BEAM TO SOLAR DAMAGE EXPERIMENT	SM	SE
	42. CONFIRM READOUT OF PP3, 4, 5 and 6	-	SM
	43. START DESPIN TIMERS	SM	DM
	44. CONFIRM SATISFACTORY OPERATION OF DESPIN TIMERS	SM	DM
	45. STOP DESPIN TIMERS AND CONFIRM TIMERS HAVE STOPPED	SM	DM
	46. REDUCE CHARGE CURRENT TO ZERO, TURN OFF CHARGE MONITOR PANEL & REPORT BATTERY VOLTAGE	SM	BHO
	47. INFORM SC THAT SPACECRAFT CHECK- OUT IS COMPLETE AND SPACECRAFT RF WILL BE TURNED OFF	SM	SC
	48. TURN SPACECRAFT OFF	SM	BHO
	49. CONFIRM SPACECRAFT OFF	-	SM
	50. REPORT BATTERY VOLTAGE	SM	BHO
	51. REMOVE LIVE TURN ON PLUG AND REPLACE WITH DUMMY	SM	SE
	52. SECURE ANTENNAS TO MAGNETOMETER BOOM	SM	SE
T-310	53. F-1 COUNTDOWN COMPLETED	-	-

# F-0 COUNTDOWN, EPE-D

## BEFORE ORDNANCE INSTALLATION

<u>TIME (MIN)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
T-895	BEGIN SPACECRAFT CHECKS	SM	SE
1.	VISUALLY INSPECT SPACECRAFT AS PER CHECKLIST	-	SE
2.	CONNECT METER PANEL TO SPACE- CRAFT	-	SE
3.	RELEASE ANTENNAS	-	SE
4.	REPORT BATTERY VOLTAGE	SE	BHO
5.	REQUEST PERMISSION FROM SC TO TURN ON SPACECRAFT RF	SE	SC
6.	TURN SPACECRAFT ON	SE	BHO
7.	CONFIRM SPACECRAFT IS ON	-	SE/SM
8.	REPORT BATTERY VOLTAGE	SM	BHO
9.	RECORD VOLTAGES AND CURRENTS FROM METER PANEL. VERIFY READINGS ARE SATISFACTORY	SM	SE
10.	VERIFY PP READINGS ARE CORRECT	SM	SE
11.	INFORM SC THAT SPACECRAFT RF WILL BE TURNED OFF	SE	SC
12.	TURN SPACECRAFT OFF	SE	BHO
13.	CONFIRM SPACECRAFT IS OFF	-	SE/SM
14.	REPORT BATTERY VOLTAGE	SM	BHO
15.	DISCONNECT METER PANEL FROM SPACECRAFT & INSERT LIVE TURN- ON PLUG	SM	SE



# F-0 COUNTDOWN, EPE-D (continued)

## BEFORE ORDNANCE INSTALLATION

<u>TIME (MIN)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
16.	REPORT BATTERY VOLTAGE	SM	BHO
17.	REQUEST PERMISSION TO TURN ON SPACECRAFT RF	SM	SC
18.	TURN SPACECRAFT ON	SM	BHO
19.	CONFIRM SPACECRAFT IS ON	-	SM
20.	REPORT BATTERY VOLTAGE	SM	BHO
21.	TURN ON CHARGE MONITOR PANEL AND ADJUST CHARGE CURRENT TO 1.5 AMPERES AND CURRENT LIMIT AT 1.5 AMPERES.	SM	BHO
22.	PLACE SOURCES ON UCSD AND BTL EXPERIMENTS AND DISPLAY RADIO- ACTIVE WARNING SIGN	SM	SE
23.	REMOVE TAPE FROM I & E APER- TURES AND CONNECT I & E CONTROL CLIPLEAD TO ACTIVATE I & E WHEEL	SM	SE
24.	REQUEST FREQUENCY AND SIGNAL STRENGTH FROM SC	SM	SC
25.	RECORD DIGITAL AND ANALOG DATA FOR UCSD AND BTL EXPERIMENTS	SM	-
26.	RECORD TELEMETRY ENCODER INFORMATION	SM	-
27.	RECORD CHANNEL 9 AND PP7 FOR ONE REVOLUTION OF I&E WHEEL	SM	-
28.	REMOVE SOURCES AND WARNING SIGNS	SM	SE

## F-0 COUNTDOWN, EPE-D (continued)

## BEFORE ORDNANCE INSTALLATION

<u>TIME (MIN)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
29.	APPLY FLASHLIGHT BEAM TO LEFT APERTURE OF I&E SENSOR AND MONITOR CHANNEL 9 AND PP7 FOR ONE REVOLUTION OF I&E WHEEL	SM	SE
30.	REPEAT STEP NO. 29 FOR RIGHT APERTURE.	SM	SE
31.	INFORM SE OF TIME TO REMOVE I & E CLIPLEAD TO STOP I & E WHEEL IN POSITION NO. 1	SM	SE
32.	CONFIRM I&E WHEEL STOPPED IN POSITION NO. 1	-	SM
33.	REMOVE OA SENSOR TOP AND BOTTOM COVERS AND INSPECT PRISM FACES	SM	SE
34.	REPLACE TOP AND BOTTOM COVERS AND REMOVE CENTER COVER	SM	SE
35.	APPLY <u>SUN GUN</u> BEAM AT RANDOM TO OA SENSOR	SM	SE
36.	CONFIRM ALL OCTAL NUMBERS OBTAINED ON CHANNEL ZERO	-	SM
37.	APPLY STEADY <u>SUN GUN</u> BEAM TO OA SENSOR	SM	SE
38.	CONFIRM ALTERNATING 7 & 1 ON CHANNEL ZERO AND 7 AND ZERO ON CHANNEL ONE	-	SM
39.	REPLACE OA SENSOR CENTER COVER	SM	SE
40.	APPLY <u>SUN GUN</u> BEAM TO SOLAR DAMAGE EXPERIMENT	SM	SE

F-0 COUNTDOWN, EPE-D (continued)

BEFORE ORDNANCE INSTALLATION

<u>TIME (MIN)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
41.	CONFIRM READOUT OF PP3, 4, 5 and 6	-	SM
42.	START DESPIN TIMERS	SM	DM
43.	CONFIRM SATISFACTORY OPERATION OF DESPIN TIMERS	SM	DM
44.	STOP DESPIN TIMERS AND CONFIRM TIMERS HAVE STOPPED	SMQ	DM
45.	REDUCE CHARGE CURRENT TO ZERO, TURN OFF CHARGE MONITOR PANEL AND REPORT BATTERY VOLTAGE	SM	BHO
46.	INFORM SC THAT SPACECRAFT CHECK- OUT IS COMPLETE AND SPACECRAFT RF WILL BE TURNED OFF	SM	SC
47.	TURN SPACECRAFT OFF	SM	BHO
48.	CONFIRM SPACECRAFT OFF	-	SM
49.	REPORT BATTERY VOLTAGE	SM	BHO
50.	REMOVE LIVE TURN ON PLUG AND REPLACE WITH DUMMY	SM	SE
51.	SECURE ANTENNAS TO MAGNET- OMETER BOOM	SM	SE
52.	INSERT DUMMY TURN ON PLUG	SM	SE
53.	INSPECT THERMAL COATING	SM	SE
54.	REMOVE TOP AND BOTTOM COVERS FROM OA SENSOR AND INSPECT PRISM FACES	SM	SE
55.	VERIFY OA SENSOR CENTER COVER IS PROPERLY SECURED	SM	SE

F-0 COUNTDOWN, EPE-D (continued)

BEFORE ORDNANCE INSTALLATION

<u>TIME (MIN)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
	56. REMOVE PROTECTIVE COVER FROM SOLAR DAMAGE EXPERIMENT	SM	SE
	57. CHECK ALL MECHANICAL AND STRUCTURAL HARDWARE AS PER CHECKLIST	SM	SE
	58. VERIFY PROPER SEATING OF SEPARATION SWITCHES	SM	SE
	59. INFORM SC THAT SPACECRAFT IS READY FOR ORDNANCE INSTALLATION	SM	SE
T-775	60. INSTALLATION OF ORDNANCE BY DAC PERSONNEL	-	-

F-0 COUNTDOWN EPE-D  
BEFORE FAIRING INSTALLATION

<u>TIME (MIN)</u>	<u>TASK OR EVENT</u>	<u>INITIA TE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
T-475	1. PROCEED WITH F-0 CHECKS. ATTACH AND CONNECT SOLAR PADDLES. INSPECT WIRING	SM	SE
	2. TIE DOWN SOLAR PADDLES	SM	SE
	3. INSERT LIVE TURN ON PLUG AND RELEASE ANTENNAS	SM	SE
	4. REPORT BATTERY VOLTAGE	SM	BHO
	5. REQUEST PERMISSION FROM SC TO TURN SPACECRAFT RF ON	SM	SC
	6. TURN SPACECRAFT ON	SM	BHO
	7. CONFIRM SPACECRAFT ON	-	SM
	8. APPLY SUN GUN BEAM TO SOLAR PADDLES, ONE AT A TIME	SM	SE
	9. CONFIRM READOUT ON PP0 AND PP9 FOR EACH PADDLE	-	SM
	10. INFORM SC THAT SPACECRAFT RF WILL BE TURNED OFF	SM	SC
	11. TURN SPACECRAFT OFF	SM	BHO
	12. CONFIRM SPACECRAFT OFF	-	SM
	13. REPORT BATTERY VOLTAGE	SM	BHO
	14. INSERT DUMMY TURN ON PLUG & VERIFY ANTENNAS ARE FOLDED	SM	SE
	15 MAKE FINAL VISUAL INSPECTION OF SPACECRAFT AS PER CHECK LIST	SM	SE

F-0 COUNTDOWN EPE-D (continued)

BEFORE FAIRING INSTALLATION

<u>TIME (MIN)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
	16. INFORM SC THAT SPACECRAFT IS READY FOR FAIRING INSTALL- ATION	SM	SC
	17. CONFIRM REMOVAL OF TOOLS TAKEN TO TOWER	SM	SE
T-415	18. FAIRING INSTALLATION (DAC)	-	-

F-0 COUNTDOWN EPE-D  
AFTER FAIRING INSTALLATION

<u>TIME (MIN.)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
T-265			
1.	PROCEED WITH SPACECRAFT CHECKS. INSURE UMBILICALS ARE CONNECTED	SM	SE
2.	RELEASE ANTENNAS AND VERIFY PROPER FOLDOUT AGAINST FAIRING	SE	SM
3.	INSERT LIVE TURN ON PLUG & VERIFY IT IS PROPERLY SECURED	SM	SE
4.	PLACE 2 YEAR TIMER IN SPEED- UP MODE	SM	DM
5.	REMOVE APERTURE COVERING TAPES ON I & E EXPERIMENT	SM	SE
6.	REPORT BATTERY VOLTAGE	SM	BHO
7.	REQUEST PERMISSION FROM SC TO TURN SPACECRAFT RF ON	SM	SC
8.	TURN SPACECRAFT ON	SM	BHO
9.	CONFIRM SPACECRAFT ON	-	SM
10.	REPORT BATTERY VOLTAGE	SM	BHO
11.	TURN ON CHARGE MONITOR PANEL & INCREASE CHARGE CURRENT TO 1.5 AMPERES & CURRENT LIMIT AT 1.5 AMPERES	SM	BHO
12.	REQUEST FREQUENCY & SIGNAL STRENGTH FROM SC	SM	SC
13.	VERIFY CORRECTNESS OF PP READINGS & I & E WHEEL POS.	SM	-

F-0 COUNTDOWN EPE-D (continued)  
AFTER FAIRING INSTALLATION

<u>TIME (MIN.)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
14.	VERIFY CORRECTNESS OF ID READ- OUTS FOR BTL EXPERIMENT ON CHANNELS 2, 3 & 11	SM	-
15.	VERIFY CORRECTNESS OF UCSD FORMAT ON CHANNELS 4, 5 & 6	SM	-
16.	VERIFY ZERO READOUT FOR CHANNELS 0 and 1	SM	-
17.	VERIFY CORRECT BTL ANALOG READOUT FOR CHANNELS 7 & 8	SM	-
18.	VERIFY CORRECT I & E READOUT FOR CHANNELS 9 & 10	SM	-
19.	VERIFY CORRECT MAGNETOMETER READOUT FOR CHANNELS 12 & 14	SM	-
20.	VERIFY CORRECT UCSD ANALOG READOUT ON CHANNEL 13	SM	-
21.	REDUCE CHARGE CURRENT TO ZERO, TURN OFF CHARGE MONITOR PANEL & REPORT BATTERY VOLT.	SM	BHO
22.	START DESPIN TIMERS	SM	DM
23.	CONFIRM DESPIN TIMERS FUNCTION- ING SATISFACTORILY	SM	DM
24.	STOP DESPIN TIMERS & CONFIRM THAT TIMERS HAVE STOPPED	SM	DM
25.	CONFIRM CORRECT PP8 READOUT		SM
26.	CONFIRM 2 YEAR TIMER RATE	SM	DM
27.	INFORM SC THAT SPACECRAFT RF WILL BE TURNED OFF	SM	SC



F-0 COUNTDOWN EPE-D (continued)  
AFTER FAIRING INSTALLATION

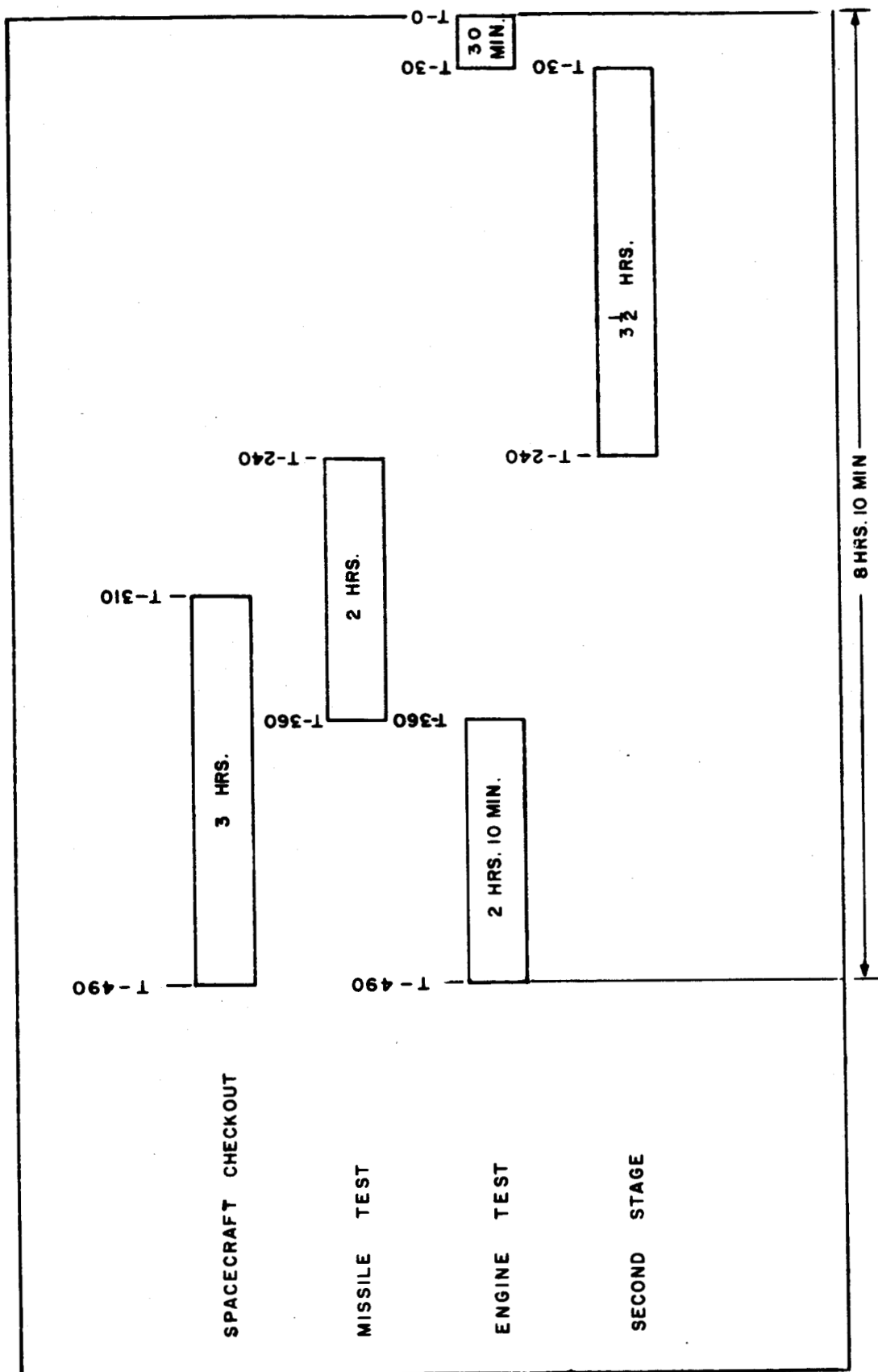
<u>TIME (MIN.)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
	28. TURN SPACECRAFT OFF	SM	BHO
	29. CONFIRM SPACECRAFT OFF	-	SM
	30. REPORT BATTERY VOLTAGE	SM	BHO
	31. TURN ON CHARGE MONITOR PANEL & INCREASE CHARGE CURRENT TO 0.5 AMPERES CURRENT LIMIT AT 0.5 AMPERES	-	-
	32. VERIFY ANTENNAS ARE PROPERLY FOLDED AGAINST FAIRING	SM	SE
	33. INFORM SC THAT SPACECRAFT IS READY FOR TOWER REMOVAL	SM	SC
T-205	34. CONFIRM REMOVAL OF ALL TOOLS TAKEN UP TOWER	SM	SE

# F-0 TERMINAL COUNTDOWN

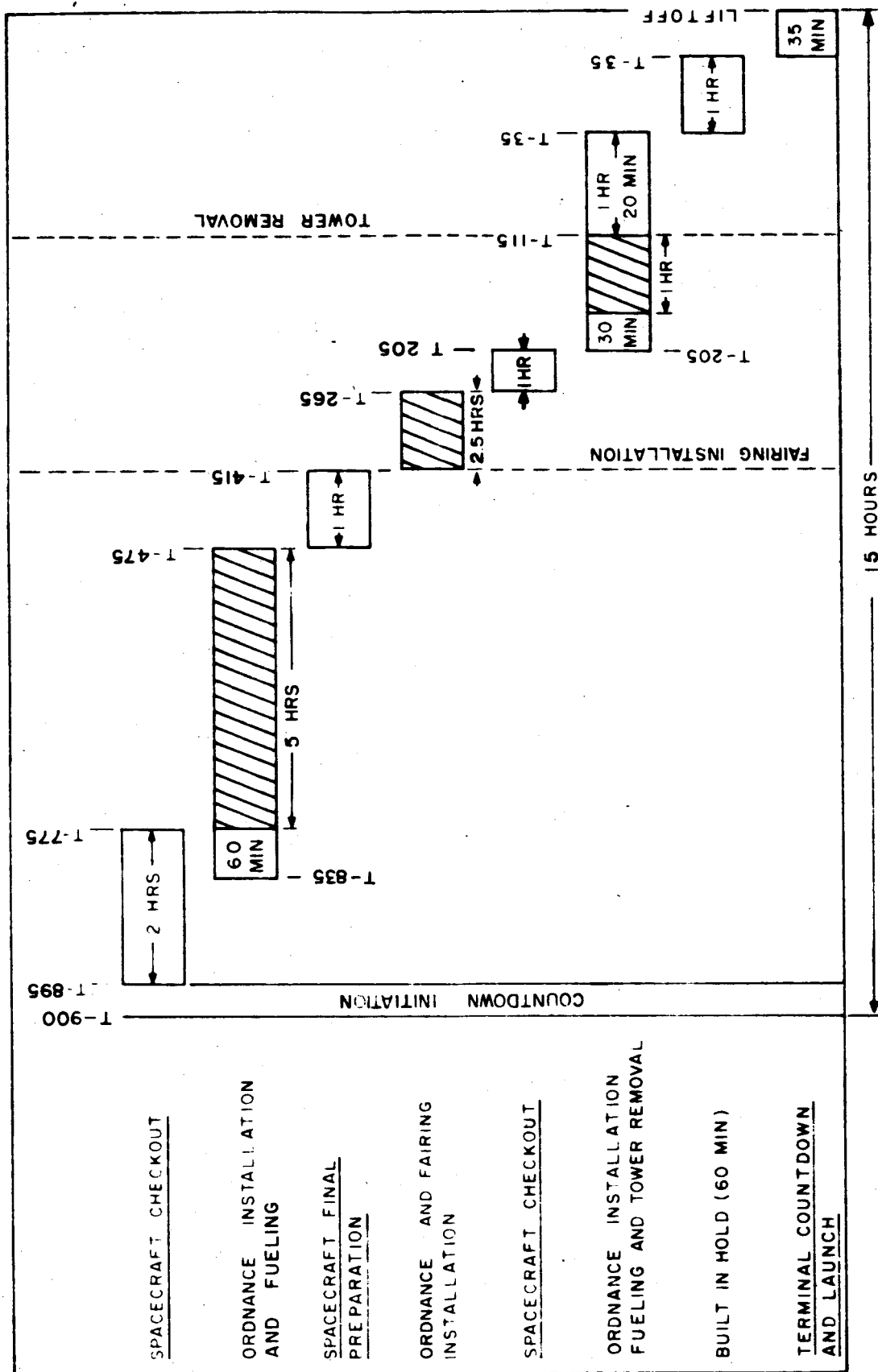
<u>TIME (MIN.)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
T-35			
	1. REDUCE CHARGE CURRENT TO ZERO, TURN OFF CHARGE MONITOR PANEL & REPORT BATTERY VOLTAGE	SM	BHO
	2. REQUEST PERMISSION FROM SC TO TURN SPACECRAFT RF ON	SM	SC
	3. TURN SPACECRAFT ON	SM	BHO
	4. CONFIRM SPACECRAFT ON	-	SM
	5. REPORT BATTERY VOLTAGE	SM	BHO
	6. TURN ON CHARGE MONITOR & ADJUST CHARGE CURRENT TO 1.5 AMPERES & CURRENT LIMIT AT 1.5 AMPERES	SM	BHO
	7. REQUEST FREQUENCY AND SIGNAL STRENGTH FROM SC	SM	SC
	8. VERIFY CORRECTNESS OF PP READINGS AND I & E WHEEL POS.	SM	-
	9. VERIFY CORRECTNESS OF ID READ- OUTS FOR BTL EXPERIMENT ON CHANNELS 2, 3 & 11	SM	-
	10. VERIFY CORRECTNESS OF UCSD FORMAT ON CHANNELS 4, 5 & 6	SM	-
	11. VERIFY ZERO READOUT FOR CHANNELS 0 & 1	SM	-
	12. REPORT STATUS OF SPACECRAFT TO MISSION DIRECTOR	SM	MD
	13. REDUCE CHARGE CURRENT TO ZERO & TURN OFF CHARGE MONITOR PANEL. REPORT BATTERY VOLTAGE	SM	BHO

# F-0 TERMINAL COUNTDOWN (continued)

<u>TIME (MIN.)</u>	<u>TASK OR EVENT</u>	<u>INITIATE</u>	<u>EXECUTE AND/OR ACKNOWLEDGE</u>
T-5	14. START DESPIN TIMER	SM	DM
	15. CONFIRM DESPIN TIMERS FUNCTIONING SATIS- FACTORILY	SM	DM
	16. STOP DESPIN TIMERS AND CONFIRM TIMERS HAVE STOPPED	SM	DM
	17. CONTINUALLY MONITOR ALL TELEMETRY CHANNELS		
T-0	18. LAUNCH		



F-1 SEQUENCE OF EVENTS, EPE-D SPACECRAFT LAUNCH OPERATIONS



F-0 SEQUENCE OF EVENTS, EPE-D SPACECRAFT LAUNCH OPERATIONS

## SPACECRAFT MALFUNCTION PROCEDURE

All spacecraft checkouts performed during the different phases of the launch operations are designed to detect any electronic malfunction or mechanical defect within the spacecraft system at the earliest feasible time in order to allow the maximum amount of time for correction of the malfunction and the subsequent launching of the spacecraft on schedule. However, should an electronic malfunction or mechanical defect occur during the F-0 Countdown, the following steps shall be taken in the order shown:

1. Notify MISSION DIRECTOR, explain malfunction and request further instructions;
2. Continue to monitor spacecraft performance until instructed to do otherwise by MISSION DIRECTOR.

## PERSONNEL ASSIGNMENTS

### AE HANGAR (OPERATIONS CONTROL)

Mission Director - G. Longanecker  
Assistant Mission Director - H. Meyerson  
\*Mission Coordinator - J. Brahm

### AE HANGAR (SPACECRAFT LABORATORY)

Spacecraft Monitor - W. Adams  
Spacecraft Monitor, Alternate - J. Komaromi  
Integration Technician - D. Stahl  
Integration Technician - R. Fleer  
Experimenters

### GANTRY (ELECTRONIC INTEGRATION)

Spacecraft Engineer - H. Lyons  
Integration Technician - R. Wilkinson

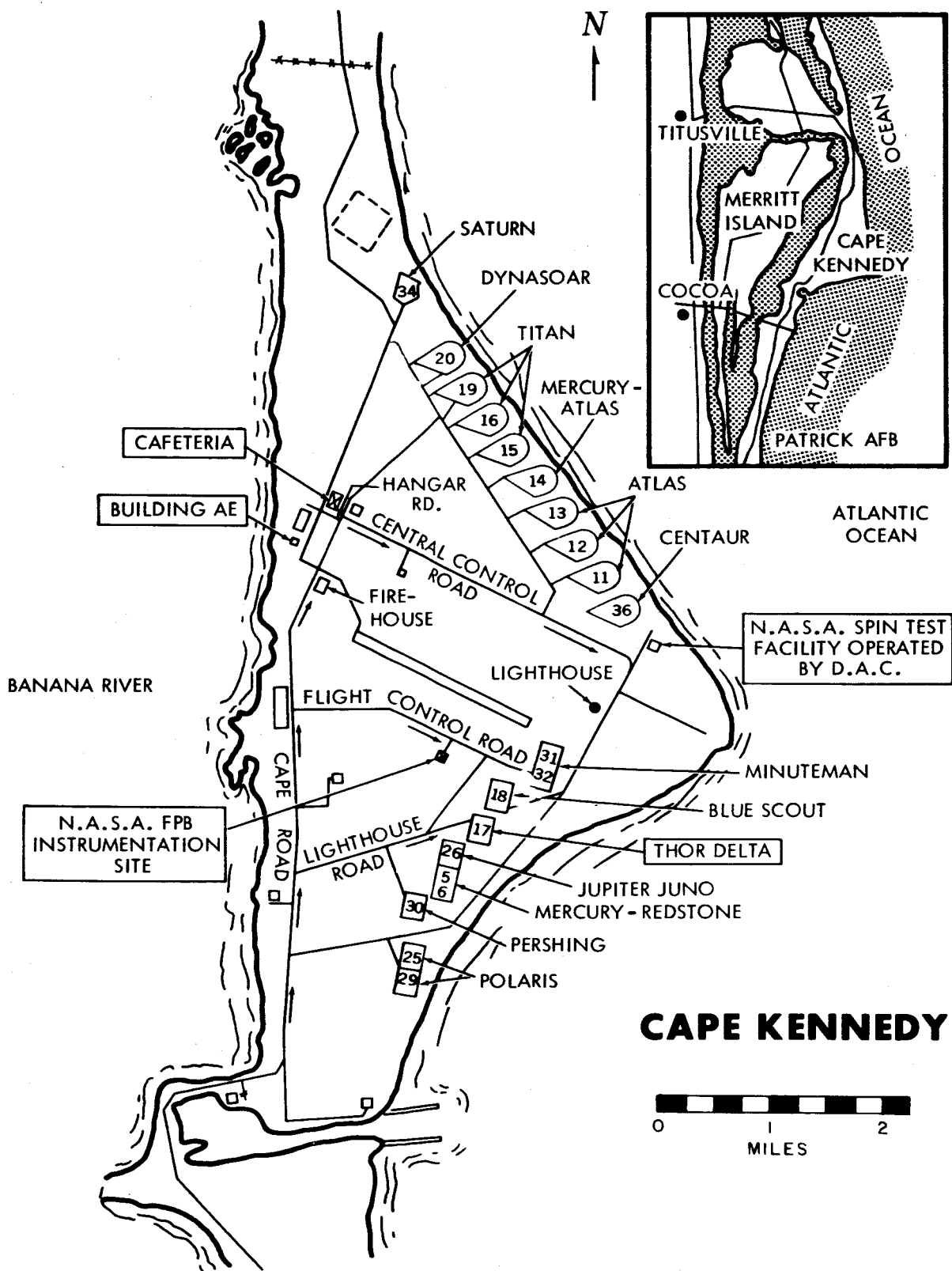
### GANTRY (MECHANICAL INTEGRATION)

Mechanical Engineer - W. Logan or J. Webb  
Mechanical Technician -

### BLOCKHOUSE

Spacecraft Control -  
Blockhouse Operator - G. Komen  
Despin Monitor -

\* Location as assigned by Mission Director.

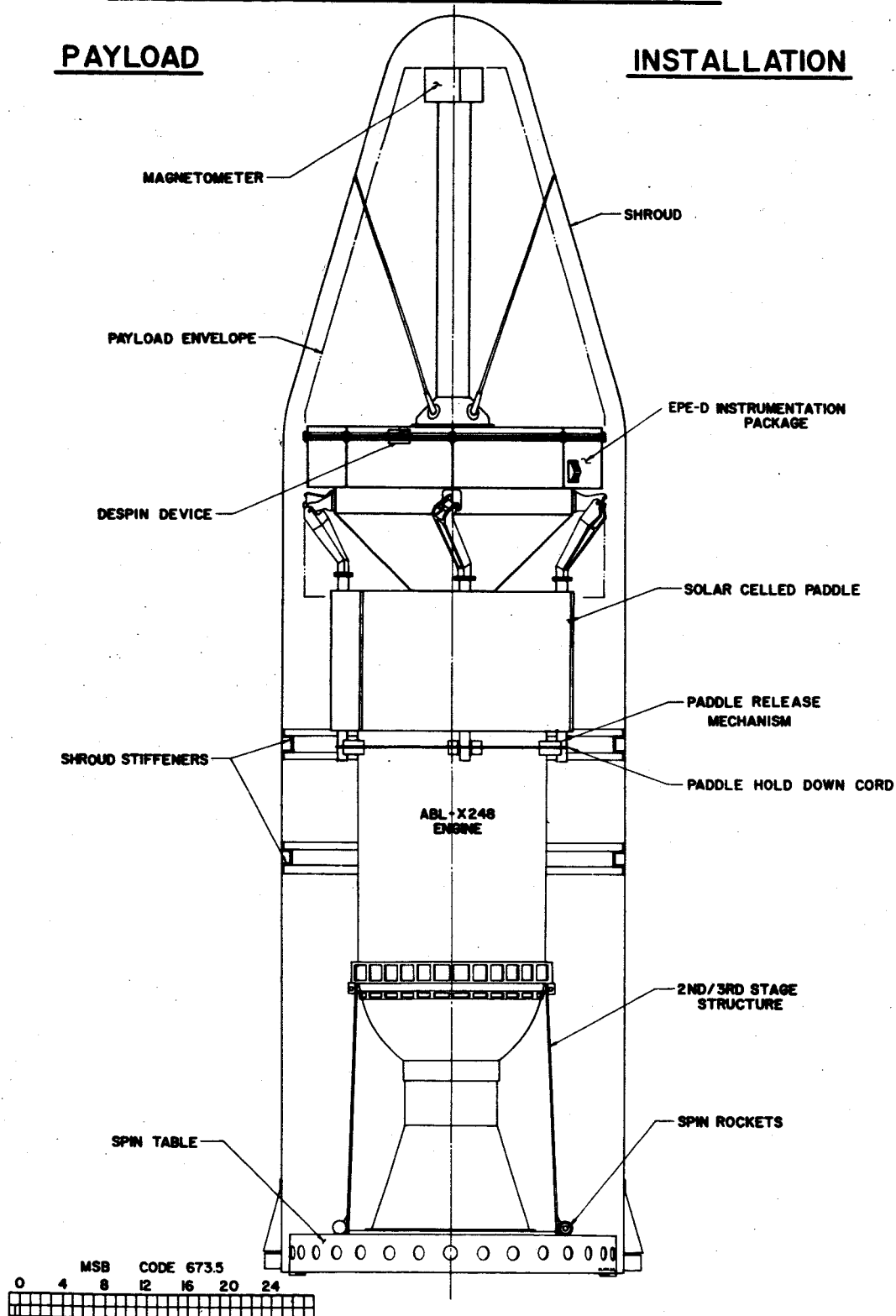




# EPE-D ENERGETIC PARTICLES EXPLORER

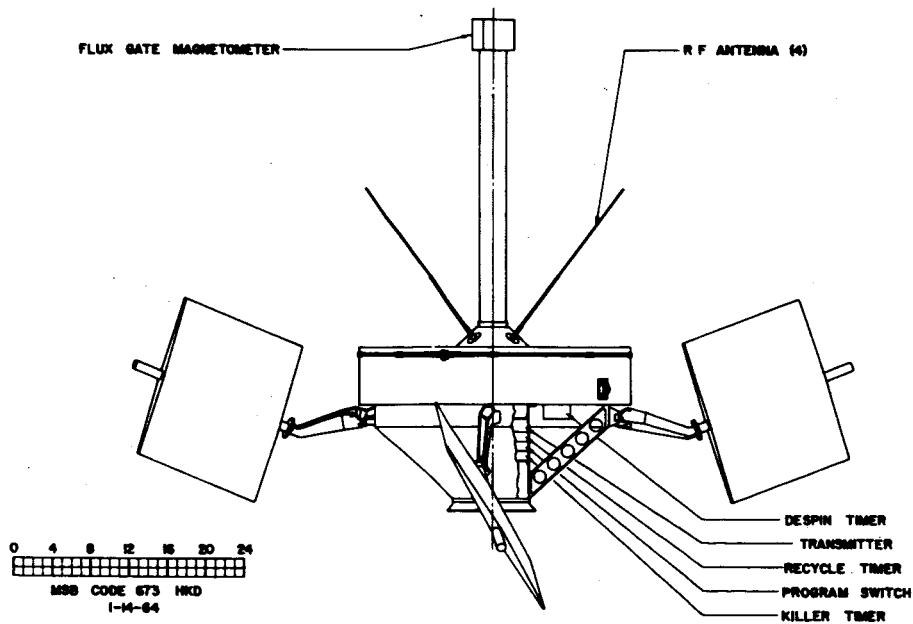
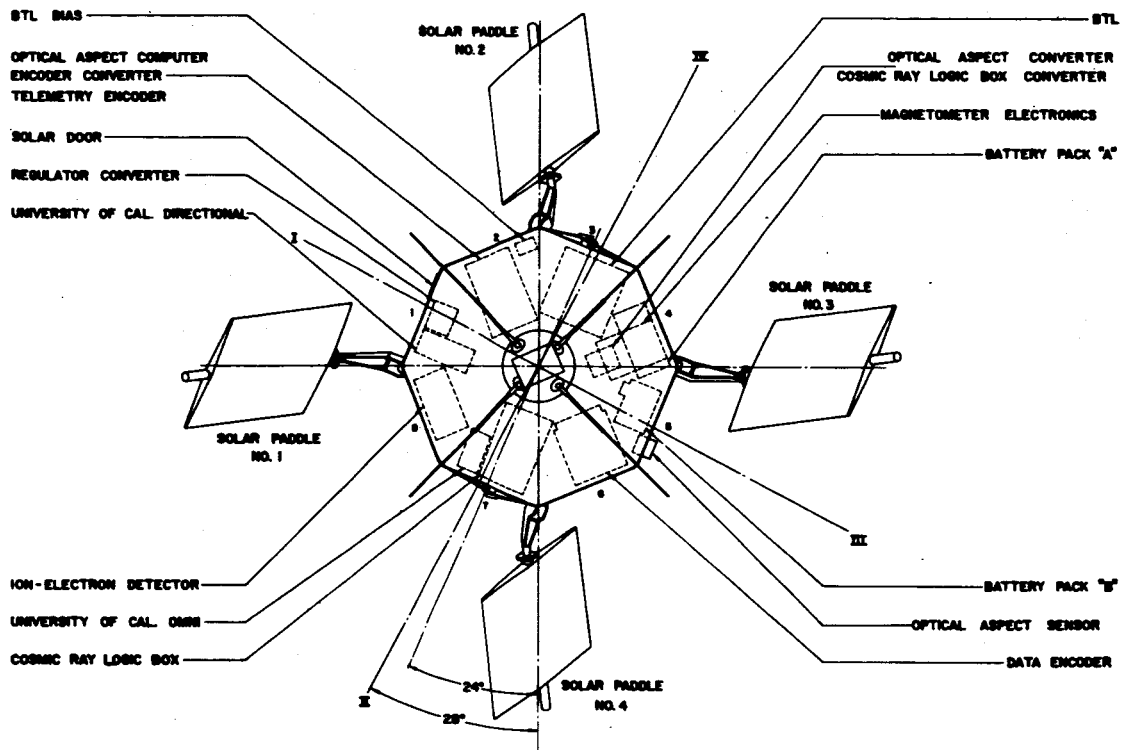
## PAYLOAD

## INSTALLATION



1-14-64

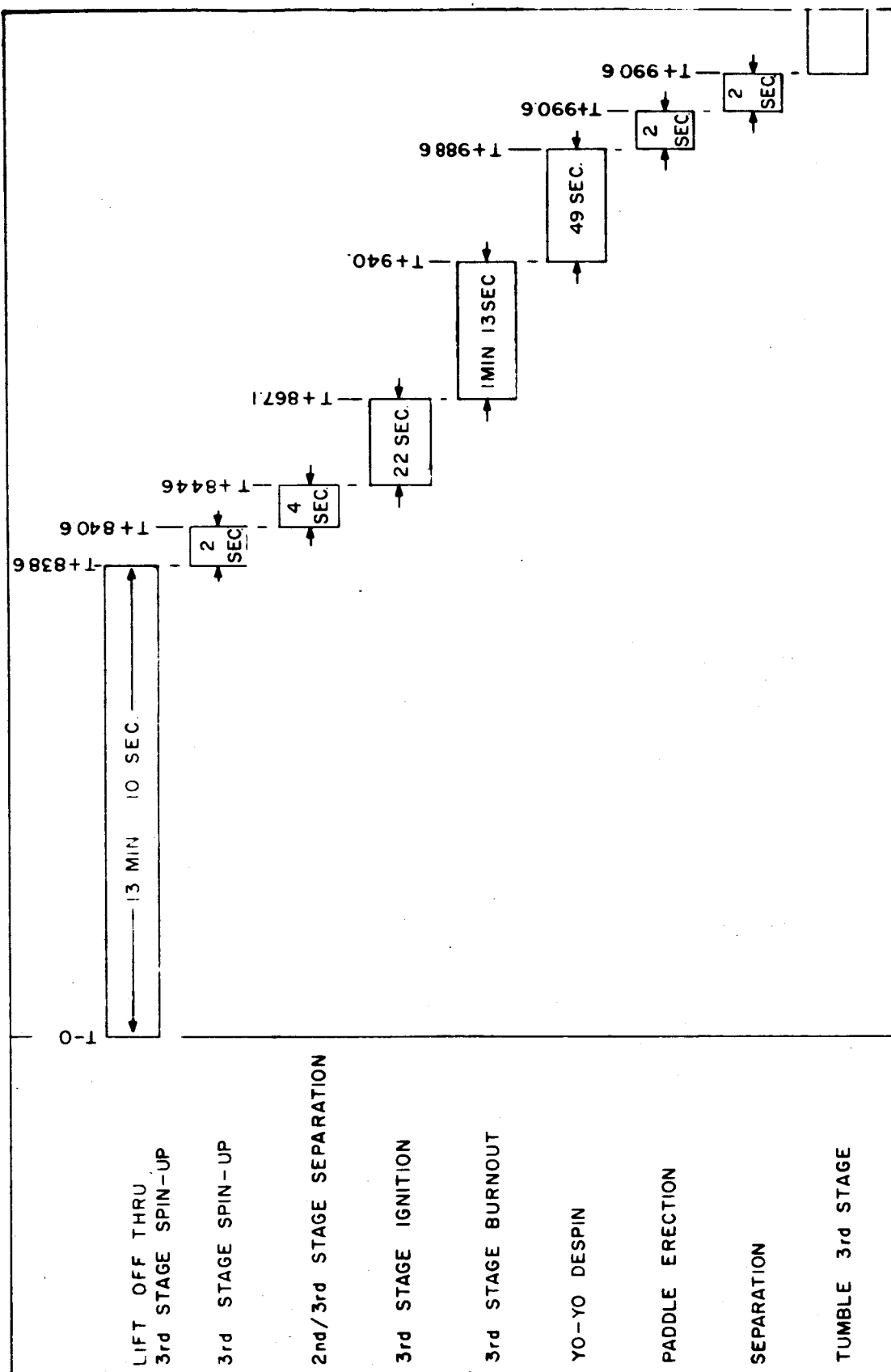
# ENERGETIC PARTICLES EXPLORER EPE-D



The diagram illustrates the sensor look angles for the Energetic Particle Explorer (EPE-D). It features a central circular area with various sensor fields of view (FOV) represented by different patterns and orientations. The sensors and their respective FOVs are:

- BTL** (Backscattered Thermal Loss): 10° CONE
- 30° ± 10° CONE**
- 34° ± 20° CONE**
- OMNIDIRECTIONAL, 180°**
- U OF CAL DIRECTIONAL (REF)**
- OPTICAL ASPECT SENSOR**
- U OF CAL OMNI 180° CONE**
- MAGNETOMETER SENSOR ORTHOGONAL**
- OPTICAL ASPECT SENSOR 180° PLANE**
- ION-ELECTRON DETECTOR 20° CONE**
- BTL (ROTATED 90° CW)**
- 30° ± 10° CONE**
- 34° ± 20° CONE**
- 10° CONE**
- U OF CAL DIRECTIONAL 30° CONE**

[illegible]



SPACECRAFT SEQUENCE OF EVENTS

### 3.3.5 FEED-BLEED CONTACTS

The contacts on the low pressure Balance were incorporated directly into the high pressure Balance. An additional set of contacts in the form of a snap-action switch was added to the high pressure Balance to provide a third mode of operation on the feed cycle as previously described.

### 3.3.6 SURGE TANK

The surge tanks in both the high and low pressure system perform identical functions. The tank used in the low pressure system appeared to have been rated at about 7,000 PSIG, however, the flared tube fittings on the ports had been used considerably as evidenced by deformation of the sealing surfaces on the ports. Consequently, an accumulator of approximately the same size incorporating threaded female bosses was adapted for use in the system to minimize possible port damage test of the Balance. Volume for the surge tank in the low pressure unit was approximately 23 in<sup>3</sup>. The volume for the high pressure is about 33 in<sup>3</sup>.

### 3.3.7 THREE-WAY VALVE

This unit is a standard three-way solenoid operated valve rated for 6,000 PSIG operating pressure. Any commercial unit is satisfactory for use if the leakage characteristics are extremely low and the operating voltage is compatible with the other valves in the system. For this particular application a Marotta Valve Corporation 209603 valve is used.

### 3.3.8 FILTERS

Low or zero leakage across the valves and regulators in the system is one of the criteria for proper operation of the system. Contaminate introduced into the system could easily damage the sealing surfaces on the valves and regulators. Consequently, two 10-micron line mounted filters were introduced into the system to minimize contamination of the system. One filter is mounted on the inlet to the Balance and the other is mounted in the outlet or controlled pressure line.